REMARKS

In this Amendment, Applicants amend claims 8 and 12 to more appropriately define the present invention. Upon entry of this Amendment, claims 8-21 remain pending, with claims 16-19 withdrawn from consideration as drawn to a nonelected invention, and claims 8-15, 20, and 21 under current examination.

Regarding the Final Office Action and the Advisory Action:

In the Final Office Action, the Examiner rejected claims 8-15, 20, and 21 under 35 U.S.C. § 103(a) as unpatentable over Applicants' admitted prior art ("AAPA") in combination with Hisamune (U.S. Patent No. 6,414,352 B1) ("Hisamune"), Aminzadeh, et al. (U.S. Patent No. 6,707,120 B1) ("Aminzadeh"), and Wolf, et al. ("Silicon Processing for the VLSI Era," v.1, 1986, pp. 161-238) ("Wolf"). In the Advisory Action, the Examiner maintained the rejections of record above. Applicants traverse the rejections, as detailed above, for the following reasons.[1]

Rejection of Claims 8-15, 20, and 21 under 35 U.S.C. § 103(a):

Applicants respectfully traverse the rejection of claims 8-15, 20, and 21 under 35 U.S.C. § 103(a) as being unpatentable over AAPA in combination with Hisamune, Aminzadeh, and Wolf, and submit that a *prima facie* case of obviousness has not been established.

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). M.P.E.P. § 2142, 8th Ed., Rev. 2 (May 2004), p. 2100-128.

[1] The Office Action contains statements characterizing the related art, case law, and the claims. Regardless of whether any such statements are specifically identified herein, Applicants decline to automatically subscribe to any statements in the Office Action.

Applicants respectfully point out that AAPA, whether taken alone or in combination with Hisamune, Aminzadeh, and Wolf, does not teach or suggest each and every element of Applicants' claimed invention.

Applicants' independent claims 8 and 12 each recite, in part,

> the thermal oxidation process using an oxidizing gas containing one of ozone and oxygen radicals, the oxygen radicals being generated by remote plasma oxidizing method or by reacting a first gas containing oxygen and a second gas containing hydrogen, and a concentration of nitrogen of the part of the insulating film under an edge portion of the film being decreased by the thermal oxidation process (claim 8);

> the thermal oxidation process using an oxidizing gas containing one of ozone and oxygen radicals, the oxygen radicals being generated by remote plasma oxidizing method or by reacting a first gas containing oxygen and a second gas containing hydrogen, and a concentration of nitrogen of the part of the insulating film under an edge portion of the film being decreased by the thermal oxidation process; and subjecting the semiconductor structure subjected to the oxidation process to at least one of a nitridation process and an additional oxidation process (claim 12).

AAPA in combination with Hisamune, Aminzadeh, and Wolf do not teach or suggest at least these elements of independent claims 8 and 12.

Regarding AAPA, the Examiner admitted that

> "[t]he applicants' admitted prior art does not provide, in the oxidation step, a surface of the semiconductor substrate is lowered, oxidizing gas containing one of ozone and oxygen radicals, *the oxygen radicals being generated by remote plasma oxidizing method or by reacting a first gas containing oxygen and a second gas containing hydrogen...*" (Final Office Action, p. 2, emphasis in original).

On page 3 of the Final Office Action, the Examiner recognized that Hisamune is directed to "conventional oxidation processes" where an "oxygen radical [is] created within a furnace" (emphasis in original). The Examiner further cited Wolf in an attempt to show that Hisamune's oxidation in a furnace is compatible with Wolf's thermal oxidation "wherein plasma oxidation and oxygen/hydrogen reacting are taught." The process disclosed in Wolf, however, is a CVD

process, not "the thermal oxidation process using an oxidizing gas containing one of ozone and oxygen radicals," required by claims 8 and 12. CVD is an entirely different process from the claimed "the thermal oxidation process using an oxidizing gas containing one of ozone and oxygen radicals," and cannot produce a bird's beak.

The Examiner's remarks fail to address the fact that Hisamune does not teach or suggest Applicants' claimed "thermal oxidation process," as recited in claims 8 and 12. The claimed "thermal oxidation process" is part of the claimed "method of manufacturing a semiconductor device." The claimed method further includes "forming an insulating film containing silicon and nitrogen," "forming a film which must be processed and which contains silicon on the insulating film," "processing the film which must be processed to cause a portion of the insulating film to be exposed to the outside," and "lowering a surface of the semiconductor substrate under a part of the insulating film relative to a surface of the semiconductor substrate under the film which is processed to cause the portion of the insulating film to be exposed to the outside by applying a thermal oxidation process." The claimed "thermal oxidation process" therefore processes, among other things, the claimed "insulating film containing silicon and nitrogen," according to independent claims 8 and 12.

Moreover, Wolf does not teach or suggest the claimed "thermal oxidation process," which processes, among other things, "an insulating film containing silicon and nitrogen." The Examiner's citation of Wolf does not substantiate his allegation that Wolf, Hisamune, and AAPA are combinable to produce the claimed invention. [2]

[2] In the Advisory Action, the Examiner referred Applicants' to Wolf's chapter 7, starting at p. 198, "wherein the thermal oxidation is taught." Applicants' note, however, that Wolf's teaching of thermal oxidation in chapter 7 still does not teach Applicants' claimed "the thermal oxidation process using an oxidizing gas containing one of ozone and oxygen radicals ... and a concentration of nitrogen of the part of the insulating film under an edge portion of the film being decreased by the thermal oxidation process," according to amended claims 8 and 12.

In the second paragraph on page 3 of the Final Office Action, the Examiner discussed the teachings of AAPA, Hisamune, and Wolf regarding bird's beak oxidation, however, the Examiner did not address Applicants' previous arguments that Hisamune's teaching of bird's beak suppression (*See* col. 1, lines 9-10 and col. 3, lines 24-28) actually teaches away from the claimed invention. The Examiner's citation to Wolf in this instance is not made to counter Applicants' arguments that Hisamune teaches away from the claimed invention. Rather, the Examiner cited Wolf to support his argument that oxygen and hydrogen gases are used in plasma oxidation. *See* Final Office Action, p. 3. Thus, Wolf still does not cure AAPA or Hisamune's deficiencies pertaining to independent claims 8 and 12.

On page 4 of the Final Office Action, the Examiner alleged Applicants' claimed "lowering a surface of the semiconductor substrate..." (claim 8) was inherent in Aminzadeh, and cited Wolf to support the inherency allegation. While the citation to Wolf is presumably in response to Applicants' previous arguments against the Examiner's improper allegations of inherency (*See* pp. 10-11 of the November 10, 2004, Amendment), the Examiner's additional citation to Wolf still does not establish a *prima facie* case of obviousness of Applicants' claimed "thermal oxidation process," which processes, among other things, "an insulating film containing silicon and nitrogen," according to independent claims 8 and 12.

In the paragraph bridging pages 4 and 5 of the Final Office Action, the Examiner admitted that Wolf "does not teach the step of subjecting this particular structure to at least one of a nitriding process and an additional oxidation process," presumably in reference to the last element of claim 12. The Examiner then applied Aminzadeh (and its internal reference to "Kusunoki et al. in IEEE IEDM, vol. 91") to allegedly address this deficiency. The Examiner's citation to Aminzadeh, however, still does not demonstrate that any or all of Wolf, Aminzadeh,

Hisamune, or AAPA teach or suggest Applicants' claimed "thermal oxidation process," which processes, among other things, "an insulating film containing silicon and nitrogen," according to independent claims 8 and 12.

Applicants further submit that the cited references do not teach or suggest at least "a concentration of nitrogen of the part of the insulating film under an edge portion of the film being decreased by the thermal oxidation process," according to Applicants' amended claims 8 and 12.

Furthermore, in response to the Examiner's allegation that "one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references..." (Final Office Action, p. 6), Applicants submit that the arguments presented in the November 10, 2004, Amendment and the arguments presented herein do not attack each reference individually. For the record, Applicants point out that they have considered Wolf, Aminzadeh, Hisamune, and AAPA *together*, so the Examiner's allegation is not true. Thus, Applicants have pointed out the deficiencies of the combination of Aminzadeh, Hisamune, and AAPA, particularly that the combination of references fails to teach or suggest at least Applicants' claimed "thermal oxidation process," which processes, among other things, "an insulating film containing silicon and nitrogen," as recited in independent claims 8 and 12. The Examiner's additional citation to Wolf does not change this, and does not cure the deficiencies of Aminzadeh, Hisamune, and AAPA.

Applicants point out to the Examiner that it "is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art." *See In re Wesslau*, 147 U.S.P.Q. 391

(C.C.P.A. 1965). *See also* M.P.E.P. § 2141.02. The Examiner's combination of Wolf, Aminzadeh, Hisamune, and AAPA is not proper, because the Examiner is picking out only so much of each reference to support his position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art (e.g., the fact that Hisamune's oxidation process and teaching of bird's beak suppression actually teach away from the claimed invention).

Moreover, in the "Response to Arguments" section of the Final Office Action, the Examiner alleged that "Applicant's first argument on page 8 attacks Hisamune's invention" (Final Office Action, p. 6). This is not true, as Applicants' previous arguments attacked the *rejection based on* Hisamune, not the invention of Hisamune itself.

The Examiner did acknowledge, however, that in the previous amendments to claim 8 and 12, "the added term 'remote' in the amended claims changes the scope of the claim[s] and is treated differently as in the rejection above" (Final Office Action, p. 7).

Finally, the Examiner responded to Applicants' remaining arguments (on pp. 7-8 of the Final Office Action) with a list of conventional case law citations. Applicants assert that the Examiner's citations to *In re Susi, In re Gurley, Merck & Co. v. Biocraft Laboratories, and Celeritas Tech. Ltd. v. Rockwell Int'l. Corp.* (Final Office Action, p. 7, and repeated on the Advisory Action Continuation Sheet) are not applicable in this case. In a rejection, the Examiner may use the rationale of legal precedent established by prior case law, subject to the following considerations. "The examiner must apply the law consistently to each application after considering all the relevant facts. *If the facts in a prior legal decision are sufficiently similar to those in an application under examination*, the examiner may use the rationale used by the court." M.P.E.P. § 2144 (emphasis added). As an initial matter, it is impermissible for the

Examiner to rely on these cases as a short-cut means to establish a *prima facie* case of obviousness without first establishing the elements of a *prima facie* case as required by the Supreme Court's decision in *Graham v. John Deere*, 383 U.S. 1, 148 U.S.P.Q. 459 (1966). Further, and more importantly, the cited cases are not applicable.

For example, in *In re Susi*, 169 USPQ 423 (CCPA 1971), the invention related to a composition of polymer and a stabilizer (*i.e.*, additives) and a process of stabilizing the polymer by adding a stabilizing amount of the stabilizer. *See In re Susi*, at 424. However, "[t]he arguments for patentability have been predicated *solely* on the additives, and not the specific plastics to which they are added." *Id.* (emphasis added). The court held that "the combination, for the same purpose, of one additive explicitly disclosed in the prior art and another suggested by the prior art would at least [be] prima facie obvious." *Id.* at 426.

The present invention differs from the invention in *In re Susi*, as the claimed invention is directed to a method of manufacturing a semiconductor device. Accordingly, Applicants' claimed invention is not analogous with the process of stabilizing a polymer in *In re Susi*. Thus, the reasoning applied by the court is not applicable to the claimed invention, and the Examiner has improperly applied *In re Susi*.

Furthermore, the Examiner's additional case law citations to *Gurley, Merck, and Celeritas*, are also not applicable to the claimed invention. Based on the arguments presented above, Applicants deem it unnecessary to individually address the details of these additional cited cases, because Applicants have already shown that the Examiner's 35 U.S.C. § 103(a) rejection is improper and that the cited case law is not applicable.

For the reasons argued above, AAPA, Hisamune, Aminzadeh, and Wolf, taken alone or in combination, fail to teach or suggest each and every feature of independent claims 8 and 12. Therefore, the Examiner has not established a *prima facie* case of obviousness.

Claims 8 and 12 are therefore allowable, and claims 9-11, 13-15, 20, and 21 are also allowable at least by virtue of their respective dependence from allowable base claim 8 or 12. Therefore, the improper 35 U.S.C. § 103(a) rejection of claims 8-15, 20, and 21 should be withdrawn.

Conclusion:

In view of the foregoing, Applicants request reconsideration of the application. Pending claims 8-15, 20, and 21 are in condition for allowance, and Applicants request a favorable action.

If there are any remaining issues or misunderstandings, Applicants request the Examiner telephone the undersigned representative to discuss them.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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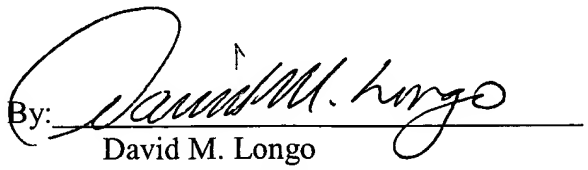
Dated: May 11, 2005

By: 

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